

REMARKS

In the OFFICE ACTION dated November 1, 2004, Claims 1-16 and 23-24 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite due to a lack of clear antecedent basis for the term "prepreg resin". Applicants amend Claim 1 as suggested by the Examiner to overcome this rejection.

Claims 7 and 8 were also rejected under 35 U.S.C. 112, second paragraph, due to a lack of antecedent basis for the term "the curing temperature range". Applicant cancels claim 7 as being duplicative (as noted by the Examiner), so that this rejection is moot with respect to claim 7. Applicant amends Claim 8 to remove the objected to language.

Claim 24 was rejected under 35 U.S.C. 112, second paragraph, due to a lack of antecedent basis for the term "said fabric layer". Applicant amends Claim 24 to more clearly set forth that "said fabric layer" is the fabric layer present in the self-adhesive prepreg according to Claim 1.

As set forth in paragraphs 6-11 of the Office Action, all of the claims have been rejected under 35 U.S.C. 103 (a) as being unpatentable over Kishi et al. in view of Recker et al. when taken alone and/or in combination with a number of secondary references.

Kishi et al., like the present invention, is directed to providing self-adhesive prepregs that are designed specifically for bonding to honeycomb. The basic problem faced by both Kishi et al. and applicant is that the resins used in such self adhesive prepregs must function both as the prepreg resin and as the adhesive that bonds the prepreg to the core. As pointed out by Kishi et al., "the resin existing in the prepreg layers must migrate into the honeycomb core to sufficiently wet the honeycomb walls, instead of the resin in the adhesive films, and it has been a very difficult problem to achieve a high bonding strength." (see Kishi et al., page 2, lines 30-32, emphasis added). As pointed out by the Examiner (see the Office Action, page 4, middle), Kishi et al. then goes on to describe the role that viscosity plays in the bonding process and why it is so difficult to make a self-adhesive prepreg (Kishi et al., page 2, lines 32-43).

Kishi et al.'s approach to solving the above problem is completely different from applicant's. Kishi et al. teaches the use of a self-adhesive resin that includes an epoxy

resin (Component [A]), a curing agent (Component [B]) and one or more additives (Component [C]). These three components are selected to provide four different versions of resins. The first two versions require that the Components be combined to provide a resin which has a modulus of storage rigidity (G') that is within given ranges. In the third version, the Components are combined to provide a resin that has a thixotropic index and viscosities that are within certain ranges. In the fourth and final version, Component C is specifically composed of solid rubber and fine silica particles (Kishi et al., page 4, lines 5-44).

Nowhere does Kishi et al. teach or suggest the present invention, which is based on the discovery "that certain types and sizes of thermoplastic particles may be used as fillet forming particles that can be incorporated into the prepreg resin in amounts sufficient to make the prepreg self-adhesive while not adversely affecting the viscosity or other properties of the resin which are required for its use as a prepreg resin." (See applicant's Summary of the Invention). This is an important feature of the present invention, which solves the above stated difficult problem of providing a single resin that functions both as a prepreg resin and as an adhesive for bonding to honeycomb.

The present invention requires the use of: 1) a thermoplastic viscosity control agent (either polyetherimide or micronized polyethersulfone) that is substantially dissolved in the thermosetting resin; and 2) thermoplastic fillet forming particles that are not dissolved in the prepreg resin, but do dissolve during bonding to the honeycomb. As set forth in applicant's Summary of the Invention, "the fillet forming particles dissolve during the curing process to provide the resin with adhesive characteristics that enhance fillet formation between the prepreg and honeycomb. Fillet size and shape are known to be an important consideration in the bonding of face sheets to honeycomb. In addition, the dissolved fillet forming particles provide toughening of the resin which improves overall bond strength." This is completely different from the Kishi et al. approach, which only requires the use of "additives" to reach certain defined functional ranges of storage rigidity, thixotropy and viscosity.

With regards to “additives”, Kishi et al. discloses a laundry list of possible “additives” that might be used to provide suitable self-adhesive prepreg resins. The list of additives includes “solid rubbers, liquid rubbers, thermoplastic resin elastomers, thermoplastic resins, organic and inorganic particles and short fibers, etc.” (Kishi et al., page 6, lines 25-27). The stated sole purpose for these additives is to “play a role in changing the viscoelasticity of the resin composition for optimizing the modulus of storage rigidity, viscosity and thixotropy.” (Kishi et al., page 6, lines 24-25). Nowhere is there any teaching or suggestion to use the additive system invented by applicant where polyetherimide or micronized polyethersulfone is dissolved in the prepreg resin to control viscosity and where thermoplastic fillet forming particles, which dissolve only during the bonding process, are used to provide the dual benefit of enhancing the fillet shape/size and toughening the resin.

If anything, Kishi et al. teaches away from applicant’s invention. The fourth version of resin composition taught by Kishi et al. specifically requires that the additive component include solid rubber and fine silica particles. Further, the Examples (1-5) all require that fine silica particles be present in the additive. In Comparative Examples 1-4, the silica particles were eliminated or substantially reduced. The surface smoothness of the final honeycomb panels in Examples 1-5 were found to be excellent, whereas in the Comparative Examples, the surface smoothness was found to be insufficient. This provides a strong teaching that the use of non-dissolvable particles, such as silica, is an important part of a self-adhesive prepreg resin. This is completely contrary to applicant’s invention, which requires that the solid thermoplastic fillet forming particles dissolve during bonding to the honeycomb.

At the bottom of page 4 of the Office Action, the Examiner sets forth what Kishi et al. discloses. Applicant disagrees with the Examiner’s conclusions because they utilize hindsight. In an obviousness determination under 35 USC 103(a), Kishi et al. must be viewed for what it teaches, as discussed above. It is not appropriate for the Examiner to use applicant’s claims as a template and search through the laundry list of possible

additives disclosed by Kishi et al. to come up with applicant's invention. This is an impermissible use of hindsight.

Kishi et al. contains only two levels of teachings with respect additives. First, it provides a very broad and general disclosure that lists just about every compound that could possibly be put into a resin composition to control viscosity. This disclosure begins on page 6, line 24 and extends to page 9, line 31. There is no teaching regarding how these various compounds might be combined to form a suitable additive. Second, there is the teaching regarding the fourth version of the resin, as set forth in the Examples, which is limited to a combination of solid rubber and fine silica particles as the additive. There is nothing in between. There certainly is no teaching or suggestion which would lead one of ordinary skill in the art to make a self-adhesive prepreg resin, as claimed by applicant, which requires a combination of dissolved polyetherimide or micronized polyethersulfone (as a viscosity control agent) and non-dissolved thermoplastic fillet forming particles. Nothing in the secondary references provides these missing teachings.

Even when using hindsight, the Examiner recognizes that there is simply no disclosure in Kishi et al. regarding applicant's use of fillet forming particles that remain solid in the self-adhesive prepreg and dissolve only during the bonding process.

The Examiner relies of Recker et al. to provide this missing teaching. However, the teachings of Recker et al. are not directed to self-adhesive prepreps and should not be combined with Kishi et al. It is important to note that Recker et al. teaches that their resins may be used as a matrix resin for fiber reinforced prepreps or as a structural adhesive (See page 2, lines 3-5). Nowhere does Recker et al. teach or suggest that their resins could be used in a self-adhesive prepreg as both the prepreg matrix resin and the adhesive for bonding to honeycomb. It is also important to note that Kishi et al. specifically teaches that the popular prior art practice for bonding prepreg to honeycomb is to "stick a structural adhesive film on the surface of each prepreg layer" (see page 2, lines 44-45).

A combination of the above two teachings would not lead one of ordinary skill to modify the resins of Kishi et al. as suggested by the Examiner. Instead, one of ordinary

skill would be led to use the structural adhesive resins of Recker et al. in their usual capacity as a separate structural adhesive layer (as taught by Kishi et al.) to bond prepreg to honeycomb. Recker et al. states "it appears impossible to predict with any degree of accuracy, the behavior of broad classes of thermoplastics in a base resin system" (See page 3, lines 22-24). In view of this unpredictability, it is doubtful that one of ordinary skill would consider using the disclosure in Recker et al. to modify the compositions of Kishi et al., especially when the accepted use for such structural adhesives is as a separate adhesive film.

In view of the above remarks, applicant respectfully requests that the rejection set forth in paragraph 6 of the Office Action be reconsidered and withdrawn.

In paragraphs 7 – 11 of the Office Action, a number of different claims have been rejected based on Kishi et al. and Recker et al., when taken in view of additional references, such as Hayes, Ghali et al., Portelli et al., Maranci et al. and Japan '619. All of these additional references must be combined with Kishi et al. and Recker et al. in order to support the rejections. Applicant submits that these rejections should also be withdrawn, since they depend on Kishi et al. and Recker et al. as the basis for obviousness.

In view of the above amendments and remarks, applicants respectfully request that this application be reexamined and allowed.

Applicant encloses herewith a Request for a 1-Month Extension of Time in order to extend the due date for this Amendment until March 1, 2005.

Please charge any fees or credit any overpayments to Deposit Account No. 50-1811.

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Respectfully submitted,
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